

**WHAT IS CLAIMED IS :**

- 1    1.    A reel-deployable printed circuit board comprising:  
2                 an elongated, flexible base board having opposite edges and a slit formed into  
3                 it, the slit having an inner periphery defining a unit board within the flexible base  
4                 board; and,  
5                 a connection bar connecting the unit board to the base board such that the unit  
6                 board is pivotable on the connection bar relative to the base board.
- 1    2.    The circuit board of Claim 1, further comprising:  
2                 a bonding pad on a top surface of the unit board;  
3                 a contact on a bottom surface of the unit board; and,  
4                 a via hole through the unit board electrically connecting the bonding pad to the  
5                 contact.
- 1    3.    The circuit board of Claim 2, wherein the contact comprises a layer of copper plated  
2                 with gold.
- 1    4.    The circuit board of Claim 1, further comprising a dam inside the inner periphery of  
2                 the slit.
- 1    5.    The circuit board of Claim 1, wherein the base board is made of a glass-epoxy mate-  
2                 rial.
- 1    6.    The circuit board of Claim 1, wherein the base board includes a sprocket hole along at  
2                 least one of the edges thereof.

1    7.    The circuit board of Claim 1, wherein the base board includes a position hole along  
2    one of the edges thereof.

1    8.    The circuit board of Claim 2, further comprising:

2                 a semiconductor chip attached to an upper surface of the unit board, the chip  
3                 having a connection pad on an upper surface thereof; and,  
4                 a conductive wire having opposite ends, each bonded to a respective one of the  
5                 bonding pad on the unit board and the connection pad on the chip.

1    9.    The circuit board of Claim 8, further comprising an encapsulant formed on the top  
2    surface of the unit board and encapsulating a region including the chip, the conductive wire,  
3    the bonding pad, and the connection pad.

1    10.   A method for manufacturing a semiconductor package using a reel-deployable printed  
2    circuit board, comprising:

3                 (A) forming a printed circuit board comprising an elongated, flexible base board hav-  
4                 ing opposite edges and a slit cut through it, the slit defining a unit board within the flexible  
5                 base board that is connected to the base board and pivotable relative to it by means of a con-  
6                 nection bar extending between the two boards in a direction perpendicular to the long direc-  
7                 tion of the base board, the unit board having top and bottom surfaces, a bonding pad on the  
8                 top surface, a contact on the bottom surface, and a via hole electrically connecting the contact  
9                 with the bonding pad;

10                 (B) attaching a semiconductor chip to the top surface of the unit board;

11                 (C) electrically connecting the semiconductor chip to the bonding pad; and,

12                 (D) encapsulating the top surface of the unit board with an encapsulant in a region in-  
13                 cluding the semiconductor chip and the bonding pad.

1    11.    The method of claim 10, wherein a plurality of semiconductor packages are simultaneously manufactured on the printed circuit board, and further comprising: separating the encapsulated unit boards from the flexible base board by cutting the connection bars.

1    12.    The method of Claim 10, further comprising:

2                 winding the printed circuit board onto a cylindrical reel to store the board and  
3                 - to transport the board from one manufacturing station to another manufacturing sta-  
4                 tion; and,

5                 unwinding the printed circuit board from the reel to perform a manufacturing  
6                 operation on the board.

1    13.    The method of claim 10, further comprising forming a dam on the top surface of the  
2    unit board to prevent runoff of a liquid encapsulant.

1    14.    The method of claim 10, wherein the flexible base board is formed from a glass-epoxy  
2    material.

1    15.    The method of claim 10, further comprising forming a sprocket hole along at least one  
2    of the edges of the flexible base board.

1    16.    The method of claim 10, further comprising forming a position hole along an edge of  
2    the flexible base board.

1    17.    The method of claim 10, wherein encapsulating the unit board further comprises:  
2                 dispensing a liquid encapsulant into the region; and,  
3                 curing the liquid encapsulant.

1    18.    The method of claim 10, wherein encapsulating the unit board further comprises:  
2                 disposing a mold over the unit board;  
3                 transferring a molten encapsulant into the mold; and,  
4                 solidifying the encapsulant.

1    19.    The method of claim 10, wherein electrically connecting the semiconductor chip to  
2    the bonding pad further comprises bonding a wire having opposite ends to respective ones of  
3    the bonding pad and the chip.

1    20.    The method of claim 10, wherein electrically connecting the semiconductor chip to  
2    the bonding pad further comprises:

3                 forming a ball of conductive metal on the bonding pad or on a connection pad  
4                 formed on a surface of the chip;

5                 orienting the chip with respect to the unit board such that the bonding pad and  
6                 the connecting pad are opposed to each other, with the conductive metal ball inter-  
7                 posed therebetween; and,

8                 melting the ball such that it electrically connects the pads to each other.